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the subject of instruction; the system of marking; what we mark, ability *versus* performance.

The discussion was opened by Professor W. E. Anderson, who voiced the desirability of our attempting to put into practice the suggestions of Professor Rugg in his outline of the work done in the field of mathematics. The desirability of greater uniformity and higher standards was emphasized.

The discussion was continued with interest until adjournment was necessitated by the closing of the building under the war department regime.

Secretary Cairns gave a word of greeting from the national Association. A hearty expression of thanks was voted Professor Rugg.

G. N. ARMSTRONG, *Secretary*.

BOOK REVIEW.

SEND ALL COMMUNICATIONS TO W. H. BUSSEY, University of Minnesota.

Elementary Mathematical Analysis. By JOHN WESLEY YOUNG and FRANK MILLETT MORGAN. The Macmillan Company, New York, 1917. xii + 548 pages. $2.60.

Instructors in mathematics who are in sympathy with the recent discussions relating to the advisability of unifying the mathematics of the freshman year in college will be pleased to see this new text, for it seems to satisfy the present demand admirably. It places more emphasis "on insight and understanding of fundamental conceptions, less emphasis on algebraic technique and facility of manipulation." It provides for the general cultural aim of mathematical study by arranging the course to "cover as broad a range of mathematical concepts as possible," due consideration being given to "modern mathematical disciplines." The disciplinary value of mathematics is sought "primarily in the domain of thinking, reasoning, reflection, analysis, not in the field of memory, nor of skill in a highly specialized form of activity."

The text is distinctive in a number of respects. It embodies many features which make for economy of time and for increased efficiency. It employs progressive methods and takes advantage of recent developments in teaching freshman mathematics. The various topics of analysis are treated as belonging to a single science, and the emphasis placed upon the notion of function gives the subject a real educational and practical value. The calculus is introduced, wherever convenient, by considering the change ratio $\Delta y/\Delta x$.

The book is divided into five parts, of which the first deals with introductory concepts. The student is made acquainted, in Chapter I, with the fundamental idea of a mathematical function and its representation by analytic, tabular, and graphic methods. This is followed by Chapter II, on the relations of algebraic principles to geometry, which includes an excellent review of algebraic technique.

The second part, the longest of the five, consists of Chapters III–X. It discusses algebraic, trigonometric and exponential functions. The graphic treatment of the algebraic functions somewhat resembles the work usually left to analytic geometry. Interesting applications of slopes and maximum and minimum points are made.

The material in the chapters on trigonometry is well selected and admirably arranged. Time is saved by developing the trigonometric functions from the general angle; and the graphing in polar coördinates, another subject usually deferred to analytic geometry, adds materially to a clearer conception of the variation of the six functions. A section of particular interest at the present time is one which discusses the use of angular measurement in artillery service and gives several problems on indirect fire. We regret that space did not permit more such applications and that simple problems in aviation were not included. There is an excellent chapter on the use of logarithms and another on numerical computation; in these are considered absolute and relative errors, significant figures, and the use of the slide rule. Trigonometric equations, circular measure, and the inverse functions are well treated, and throughout the chapters on trigonometry there are many practical problems and questions.

Part III, Chapters XI–XV, takes up the study of analytic geometry. The curves, which earlier in the course were studied for the purpose of investigating properties of the functions, are here studied from the viewpoint of the equation. The familiar loci, the straight line and circle, are treated at length. The chapter on conic sections introduces only the most essential properties of those curves. Special mention should be made of the excellent chapter on parametric equations.

Topics in college algebra, including the elementary work in the theory of equations, permutations, combinations, probability, the binomial theorem, complex numbers, and the elements of determinants, occupy Part IV, Chapters XVI–XX. The placing of these subjects after the work in trigonometry and analytic geometry is logical, for the student is better prepared to understand their theory.

The last part of the book, Chapters XXI–XXII, takes up a study of the elements of solid analytic geometry. The idea of a function of two variables is emphasized and just enough is given to enable the student to grasp quickly the applications of the calculus to volumes and surfaces of solids of revolution. Four-decimal-place tables constitute the last nine pages.

This text is one of the series of mathematical texts edited by Professor Hedrick, and like the others is an example of excellent workmanship. The cuts and print are clear and attractive and the typographical errors are remarkably few. The text is used with much success in liberal arts and engineering classes in the University of North Dakota. Both instructors and students are enthusiastic over its adoption.

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